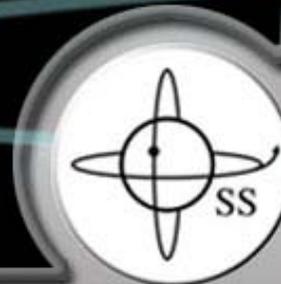




NASA

Office of Space Science

Education Support Network



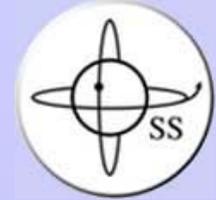
*Engage the kids. Engage the public.
Be prepared for the future*

carolyn.ng@gssc.nasa.gov, Sun-Earth Connection Education Forum





**Office of Space Science
Education and Public Outreach**



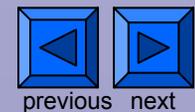
Four Themes in Space Science



- Origins of the Universe
- Structure and Evolution of the Universe
- Solar System Exploration
- Sun-Earth Connection

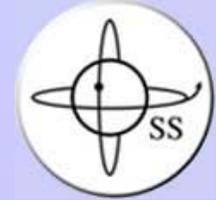


<http://spacescience.nasa.gov>

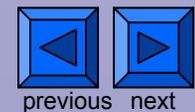
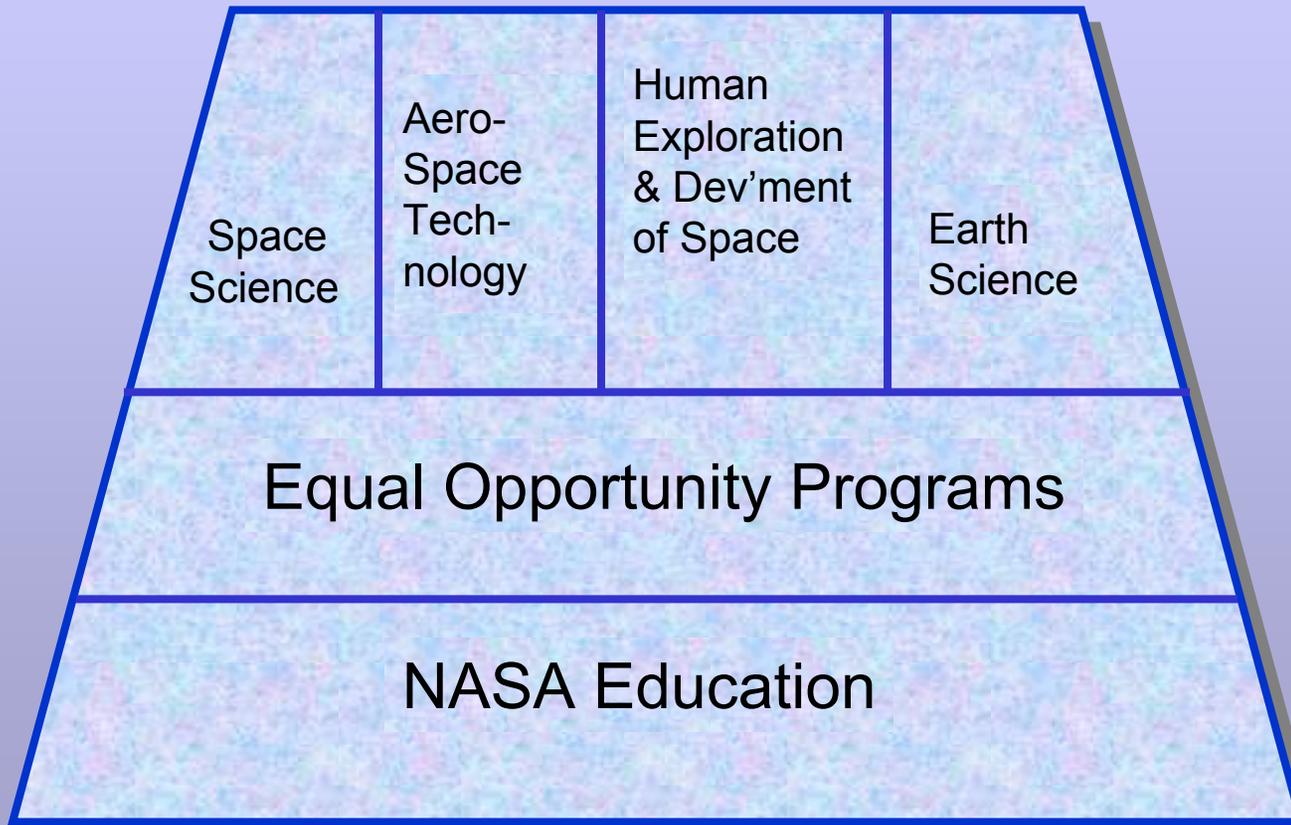




Office of Space Science Education and Public Outreach

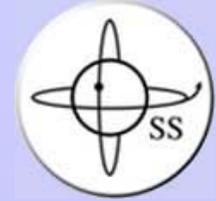


Enterprise-Embedded Education



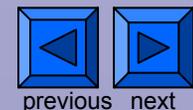


Office of Space Science Education and Public Outreach



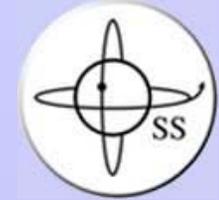
An EPO Support Network

- Flight missions and research programs
- Four Education Forums
 - Origins
 - Structure and Evolution of the Universe
 - Solar System Exploration
 - **Sun-Earth Connection**
- Five Broker/Facilitators
 - Ohio Aerospace Institute
 - SouthEast Regional Clearing House
 - DePaul University
 - Lunar and Planetary Institute
 - Space Science Institute





Office of Space Science Education and Public Outreach



Points of Contact in the Support Network



○ OSS Education Forums

provide long-term support to missions and research programs associated with particular OSS themes;
provide a 'home base' for smaller missions so that each mission does not have to create its own infrastructure;
work with the education community to develop educational programs and products suitable for national distribution;
serve as a national archiver/disseminator for education/outreach programs and products;
create and maintain an accessible directory of education/outreach products and materials.

Astronomical Search for Origins and Planetary Systems (Origins)

Space Telescope Science Institute
Point of Contact: Dr. Peggy Stanley
Baltimore, MD 21218
Phone: (410) 338-4539 Fax: (410) 338-4494
email: pstanley@stsci.edu
Web: <http://origins.stsci.edu>

Structure and Evolution of the Universe (SEU)

Smithsonian Astrophysical Observatory
Point of Contact: Dr. Roy Gould
Cambridge, MA 02138
Phone: (617) 496-7689 Fax: (617) 496-5405
email: rgould@cfa.harvard.edu
Web: <http://icfa-www.harvard.edu/seuforum>

Solar System Exploration (SSE)

NASA Jet Propulsion Laboratory
Point of Contact: Dr. Ellis Miner
Pasadena, CA 91125
Phone: (818) 354-4450 Fax: (818) 393-4217
email: ellis.miner@jpl.nasa.gov
Web: <http://www.jpl.nasa.gov/forum>

Sun-Earth Connection (SEC)

NASA Goddard Space Flight Center
Point of Contact: Dr. Richard Vondrak
Greenbelt, MD 20771
Phone: (301) 286-8112 Fax: (301) 286-1683
email: vondrak@gsfc.nasa.gov
Web: <http://sunearth.gsfc.nasa.gov>

University of California, Berkeley
Space Sciences Laboratory
Point of Contact: Dr. Isabel Hawkins
Berkeley, CA 94720-7450
Phone: (510) 643-5662 Fax: (510) 643-5660
email: isabel@ssl.berkeley.edu
Web: <http://sunearth.ssl.berkeley.edu>

★ OSS Broker/ Facilitators

identify and help establish alliances between educators and space scientists;
identify and work with space scientists and educators to address outstanding local, state, and regional needs in the formal and informal education communities;
facilitate the use of the archiving and dissemination infrastructure;
generally help space scientists become more effective participants in education and outreach.

DePaul University (DU)

Dr. Lynn Narasimhan - College of Liberal Arts and Sciences
2320 N. Kenmore
Chicago, IL 60614
Phone: (773) 325-1854 Fax: (773) 325-7334
email: cnarasim@condor.depaul.edu
Web: <http://analyzer.depaul.edu/NASABroker>

Lunar and Planetary Institute (LPI)

Ms. Pam Thompson
3600 Bay Area Boulevard
Houston, TX 77058
Phone: (281) 486-2175 Fax: (281) 486-2162
email: thompson@lpi.jsc.nasa.gov
Web: <http://cass.jsc.nasa.gov/education/education.html>

Ohio Aerospace Institute (OAI)

Dr. Larry Cooper
7651 Squirrel Creek Drive
Cincinnati, OH 45247
Phone: (513) 245-9897 Fax: (440) 962-3120
email: OSSBroker@oai.org
Web: <http://www.oai.org/oas>

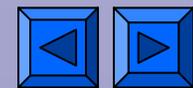
SouthEast Regional ClearingHouse (SERCH)

Dr. Cassandra Coombs - Geology, College of Charleston
66 George Street
Charleston, SC 29424
Phone: (843) 953-8279 or (888) 873-9475 Fax: (843) 953-5446
email: coombs@cofc.edu
Web: <http://www.cofc.edu/serch>

Space Science Institute (SSI)

Dr. Cheryllyn Morrow
1540 30th Street, Suite 23
Boulder, CO 80303-1012
Phone: (303) 492-7311 Fax: (303) 492-3789
email: camorrow@colorado.edu
Web: <http://ssibroker.colorado.edu/Broker>

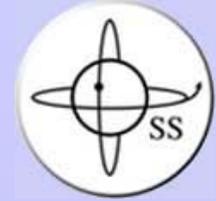
Come visit us at:
<http://spacescience.nasa.gov/education/index.htm>



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Sun-Earth Connection Science

SEC researchers at NASA GSFC, ARC, and MSFC investigate:

Quest I: Why Does the Sun Vary?

-Solar Variability and Its Effects on the Corona and Solar Wind

Quest II: How Do the Planets Respond to Solar Variability?

-Geospace Environment and Comparative Planetary Space Environments

Quest III: How Do the Sun and Galaxy Interact?

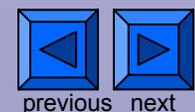
-Understand the Heliospheric Boundary and Nearby Galactic Environment

Quest IV: How Does Solar Variability Affect Life and Society?

-Space Weather

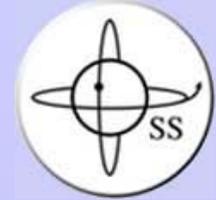


<http://www.lmsal.com/sec/Roadmap/>

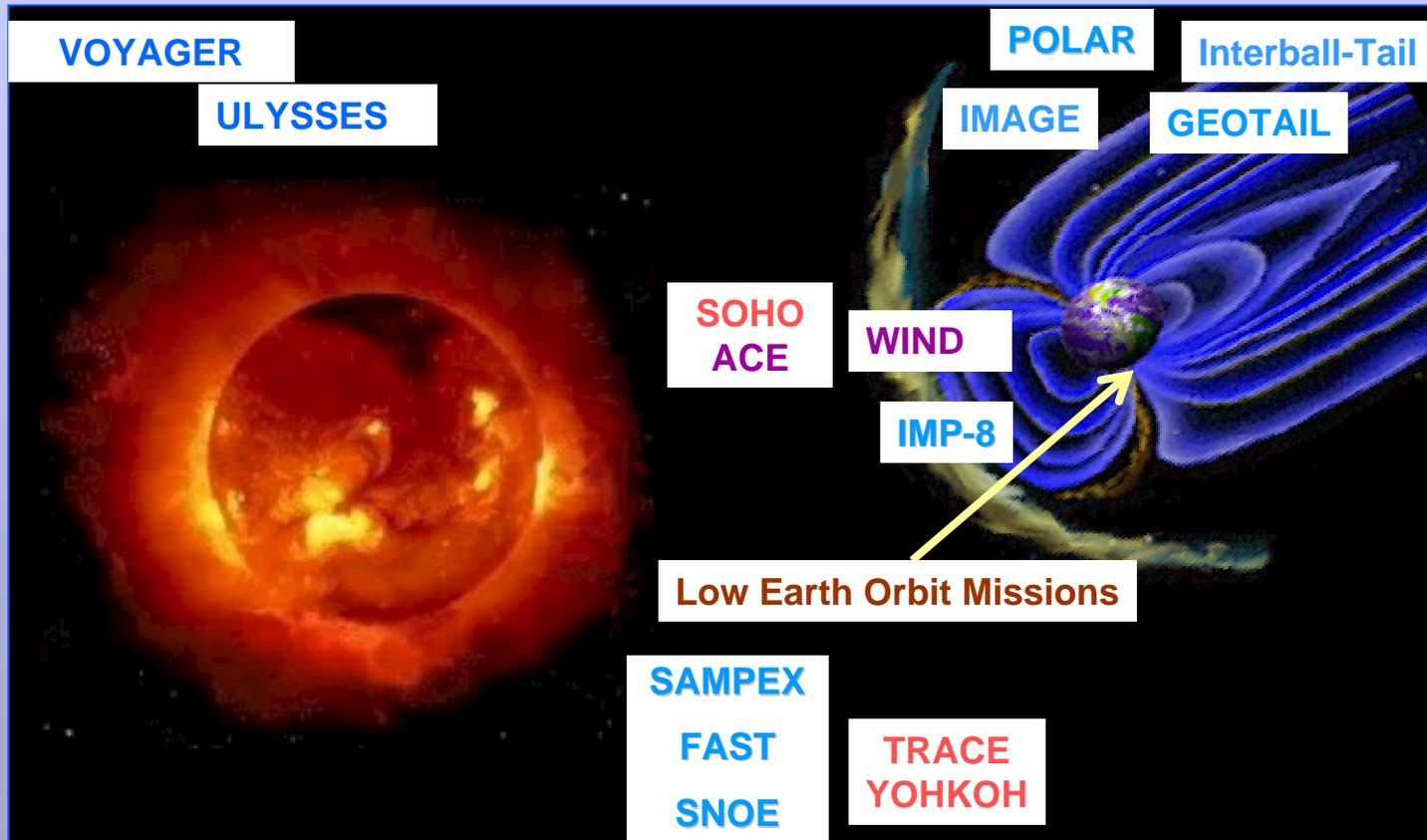




Office of Space Science Education and Public Outreach

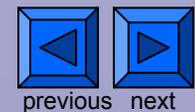


SEC Operating Missions



[Index](#)

<http://sunearth.gsfc.nasa.gov/scientists/missions.html>



Sample Sun-Earth Connection EPO Resources and Events

[IMAGE: Solar Storms and You!](#)

[ISTP and SOHO: Posters and CD-ROM](#)

[Posters of the Sun by Lockheed Martin](#)

[Yohkoh: YPOP Website](#)

[Near Future Missions: Genesis, HESSI, and TIMED](#)

[Solar Max Packet](#)

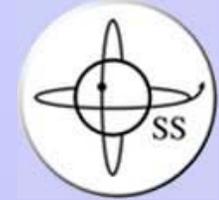
[Space Weather Center Traveling Exhibit](#)

[Solar Max Events 2001](#)

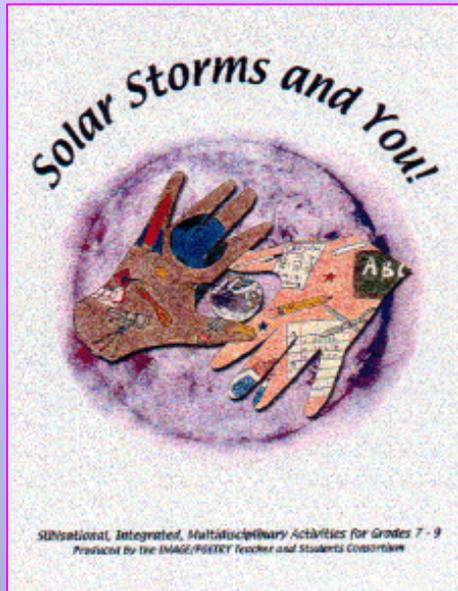




Office of Space Science Education and Public Outreach



IMAGE



**Ms. Sue Higley
Maryland Teacher of
the Year, 1999**

**Developed by Dr. Sten
Odenwald (IMAGE/POETRY)
and Ms. Sue Higley (Cherry Hill
Middle School, Elkton, MD)**

- **Enhances Math, Science, and Language Arts curriculum for Grades 7-9**

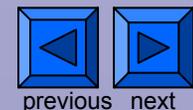
- **19 classroom activities covering basic math skills, data analysis, reading, writing, and simulation techniques**

- **Topic Areas include:**

- Solar Activity Cycles, Solar Wind, and Magnetic Storms
- Satellite Impacts, Human Activity and Solar Storms
- Satellite Design
- Planning a Trip to Mars and Radiation Dosages



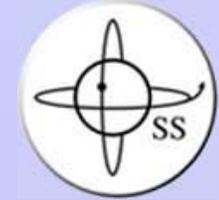
<http://image.gsfc.nasa.gov/poetry/activities.html>



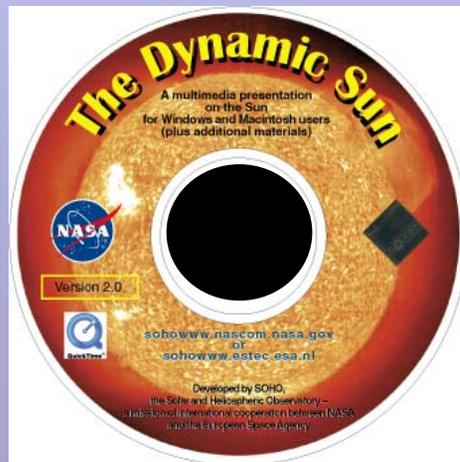
previous next



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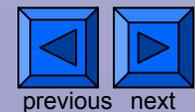
ISTP and SOHO



- *Storms from the Sun - Tormentas Solares*
 - Thousands of copies printed in English and Spanish
 - Distributed nationally at NSTA, ASTC, NCTM, APS, AGU, and La Raza
 - Available through NASA CORE
 - Available with movies on the web
- *The Dynamic Sun CD-ROM*
 - Multimedia, educational presentation on the Sun with video clips and animations
 - Version 3 has slides for elementary school as well as middle school and high school, with teacher's guides
 - Available through NASA CORE

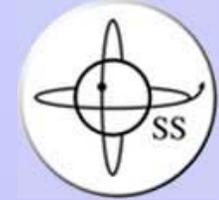


<http://www-istp.gsfc.nasa.gov/istp/outreach/>
<http://sohowww.nascom.nasa.gov/explore/materials.html>





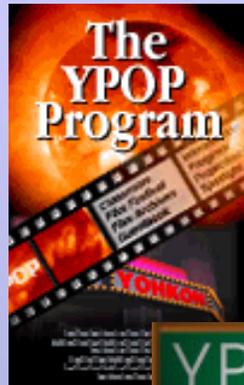
**Office of Space Science
Education and Public Outreach**



Yohkoh: YPOP Outreach Website

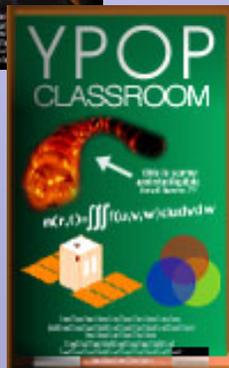
The Yohkoh Public Outreach Project (YPOP)

Produced by Lockheed Martin and Montana State University



Latest Images from Space

Provides access to latest data from
Yohkoh, SOHO & TRACE



Solar Classroom

Collection of hands-on activities
for the classroom

Yohkoh Movie Theater

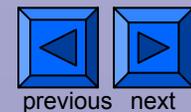
View pre-packaged movies or
make your own.



Register for Solar Week: 9-13 October 2000

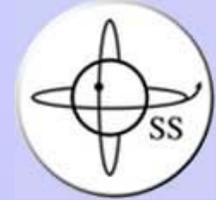


<http://www.lmsal.com/YPOP>





**Office of Space Science
Education and Public Outreach**

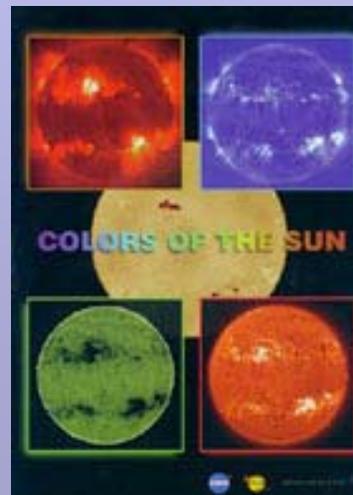


Posters of the Sun by Lockheed Martin



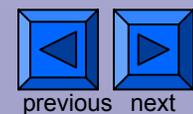
**Helioseismology
Solar Cycle
and Others...**

**Build Your Own
Spectroscope**



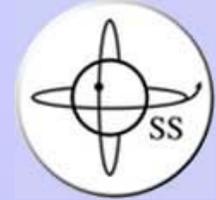
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<http://solar-center.Stanford.EDU/posters/>





**Office of Space Science
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Upcoming Missions



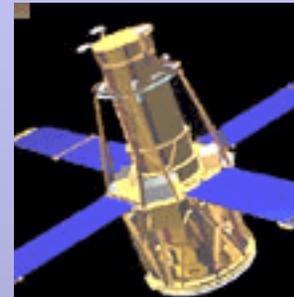
- **Chemistry of the Solar Wind**

- <http://www.genesis.org/>

- **HESSI**

- **Solar Flares**

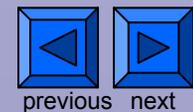
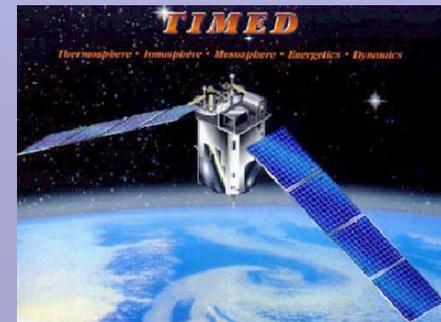
- <http://hesperia.gsfc.nasa.gov/hessi/>



- **TIMED**

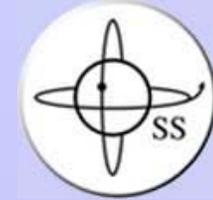
- **Structure, Dynamics, and Chemistry
of Earth's Upper Atmosphere**

- <http://stp.gsfc.nasa.gov/timed.htm>





Office of Space Science Education and Public Outreach



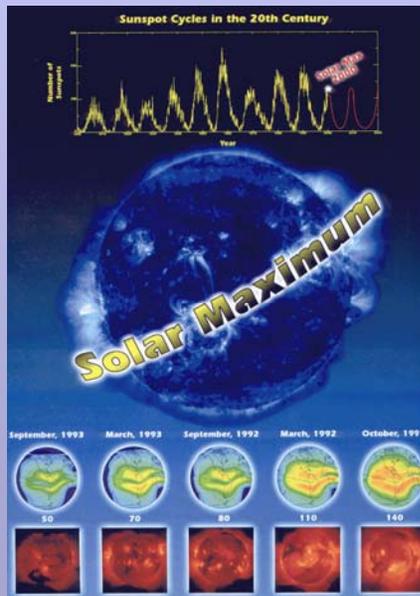
New Solar Max Packet

Living With A Star Resources Teacher's Guide

Solar Max Folder

Educational Brief

Teacher's Guide



Educational Brief
Are You Ready for Solar Max?

For thousands of years, the "Northern Lights" have lit up the skies, and human imagination, with their ghostly insouciance. More often seen in arctic regions, but occasionally as far south as Arizona and Florida, they have inspired both good and ill omens, and a fair measure of misunderstanding. What has changed in the last 100 years or so is that our steady technological advances have finally made it possible for us to see how solar storms are produced, and how their effects make it all the way to the Earth!

Solar Storms

The sunspot cycle marks out: changing episodes of storminess and quiescence. During sunspot maximum conditions, many sunspots dot the Sun's disk and this is a time when major solar storms can be spawned. About 5 years later, few spots can be seen and the Sun is relatively calm, although from time to time it can still produce a sizable storm. The interval between sunspot maxima is about 11 years. 93 million miles away, many different systems in the Earth seem to beat in step with this subtle, solar rhythm. These distant solar storms can also create episodes of extremely bad "space weather". What is the source of all this solar unrest?

The Sun is an active star. Inside the Sun, atoms are born of their electrons at temperatures of hundreds of thousands of degrees to form the Fourth State of Matter: Plasma. These plasmas boil like oatmeal in a pot, heated by the 15 million degree nuclear hot plasma deep in the Sun's core. The convection currents take up nearly 1/3 of the outer layers of the Sun, and it is somewhere in this turbulent cauldron that rivers of charged particles generate powerful magnetic fields.

The solar magnetic field is carried by convection currents to the surface where it gets concentrated into the dark spots we see as sunspots. Over time, these sunspot fields can merge together and sometimes short circuit. Like a skillful seamstress, the Sun breaks these magnetic field loops and re-ties them into larger and larger magnetic, shapes nearly as large as the Sun itself.

When magnetic fields short circuit, powerful solar flares hurl protons and electrons to near-light speed, sending blasts of X-rays into space. Millions

EB-2000-02-005-GSFC

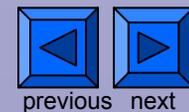
Living with a Star

Teacher Resources for Understanding Connections Between the Sun and Earth

NASA logo and other educational icons.

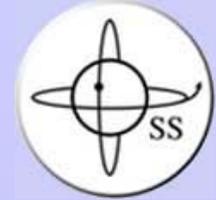
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For latest products and announcements, visit:
<http://sunearth.gsfc.nasa.gov>





**Office of Space Science
Education and Public Outreach**



Space Weather Center Traveling Exhibit

- Partners: ACE, ISTP, SOHO, SECEF, IMAGE, SUNBEAMS, Space Science Institute, NSF

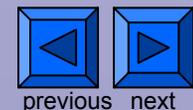


- **SEC Themes:** Dynamic Sun; Earth within Solar Atmosphere; Earth Responds to Changing Sun

- Integration of interactive, hands-on elements with near-real-time imagery, news, and data from current SEC missions
- Modular, 600-ft. exhibit begins tour in February 2000
- Expected reach: 700,000 visitors per year
- Museums for 2000: Denver Museum of Natural History, Denver, CO; Discovery Museum, Sacramento, CA; Maryland Science Center, Baltimore, MD

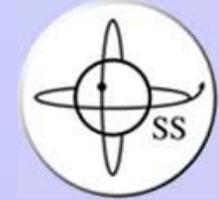


<http://www.space-science.org/SWOP/1.html>

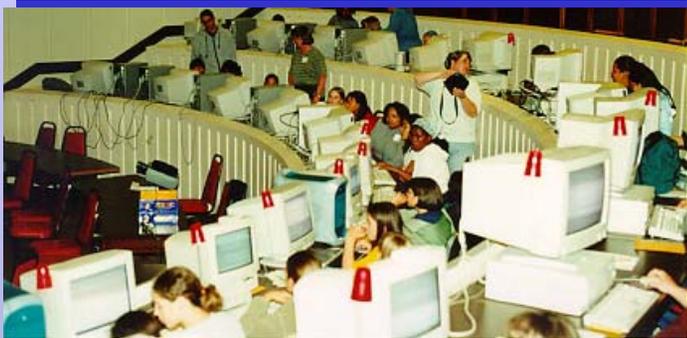




Office of Space Science Education and Public Outreach



Solar Max Events 2001: National Solar Day and Total Solar Eclipse



April 27, 2001

- National awareness Day of the Sun-Earth Connection Science to enhance science, math and technology education
- In your school or classroom with Science Presentations
- Support materials for the classroom
- Solar Day Education Kit

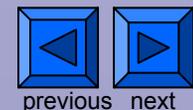


June 21, 2001

- High Visibility
- Live@The Exploratorium Webcasts
- National participation of museums
- Interactions between SEC scientists and the public

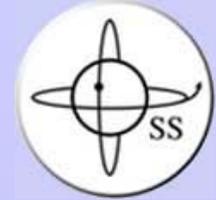


After October 1 please visit
<http://solarevents.org>



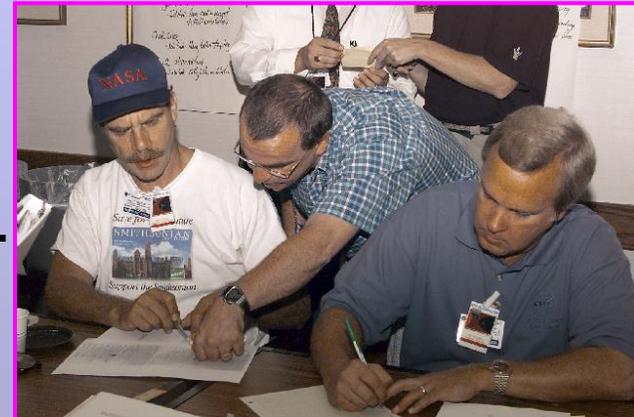


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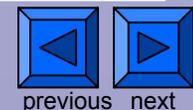


Connecting Teachers to Sun-Earth Connections

- Workshops covered recent SEC science developments, hands-on activities and lessons, education standards, pedagogy.
- Educators developed action plans and some were awarded mini-grants to facilitate local, teacher-run workshops.
- Organized and funded by ISTP, GSFC Education, and SECEF
- Since 1998 more than 45 teachers and 19 NASA education specialists (covering 18 states) have participated.

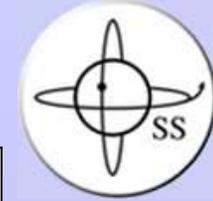


We would like to host such a program for the MU-SPIN community in the coming year.





**Office of Space Science
Education and Public Outreach**



OSS On-Line Resource Catalog



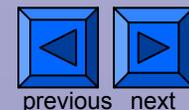
On-line catalog of
NASA Space
Science education
products with:

- A simple user interface
- High-quality space science resources

Images and text courtesy of Origins and SEC Forums

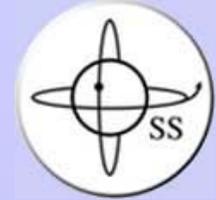
Press Release on October 2, 2000:

<http://spacescience.nasa.gov/announce/listserv.htm#research>





Office of Space Science Education and Public Outreach



In Summary

- NASA's Office of Space Science has a network to support education and public outreach efforts from K-16.
- The Sun-Earth Connection Education Forum and SEC missions offer many field tested and reviewed educational resources for use in the classroom.
- SEC missions and SECEF can organize teacher training workshops for you.
- During the year of maximum solar activities, there are opportunities to excite teachers and students with solar and space plasma physics.



<http://spacescience.nasa.gov>
<http://sunearth.gsfc.nasa.gov>

